

## National 5

### Homework EF19

1. Remove brackets and simplify:

(a)  $(2x-1)^2 - (x+3)^2$

(b)  $(a+1)^3$

2. Simplify :

(a)  $\frac{1}{x} + \frac{3}{x^2}$

(b)  $\frac{x}{x+y} + \frac{y}{x-y}$

(c)  $\frac{2}{x+2} - \frac{x+6}{x^2+6x+8}$

(d)  $\frac{6}{(x-6)^2} + \frac{1}{x-6}$

(e)  $\frac{x-5}{x-2} - \frac{x-3}{x-1}$

(f)  $\frac{x^2-4}{x^2-y^2} \times \frac{x+y}{2-x}$

3. Expand these expressions:

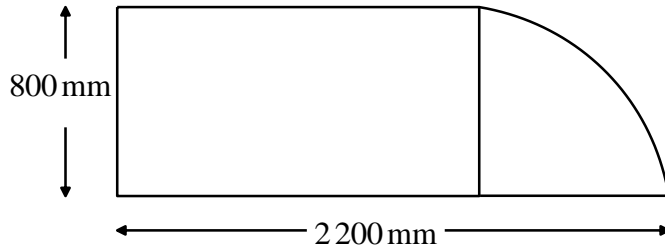
(a)  $(x^3 - x^2 + 3x - 1)(2x - 1)$

(b)  $(x-1)(x^4 + x^3 + x^2 + x + 1)$

(c)  $(a+b+c)^2$

(d)  $(x^2 + 2x + 3)(x^2 - 2x + 1)$

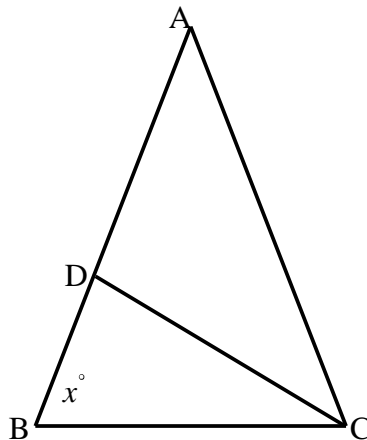
4. The worktop sketched below consists of a rectangle with a quarter circle attached. Calculate its area in square metres.



5. In the diagram below, CD is the bisector of angle ACB.

Also,  $BC = CD$  and  $AB = AC$ .

What is the size of angle CDA?



6. Given that  $\frac{1}{2} + \frac{1}{3} + \frac{1}{12} + \frac{1}{18} + \frac{1}{x} = 1$ , find the value of  $x$ .

7. How many positive square numbers are factors of 1600?

8. Solve

(a)  $\frac{1}{2}x = 6$

(b)  $\frac{1}{3}x = -4$

(c)  $\frac{1}{7}x = 10$

9. Solve

(a)  $\frac{1}{2}x + 1 = 6$

(b)  $\frac{1}{3}x + 3 = 10$

(c)  $\frac{1}{4}x - 5 = 1$

10. Simplify

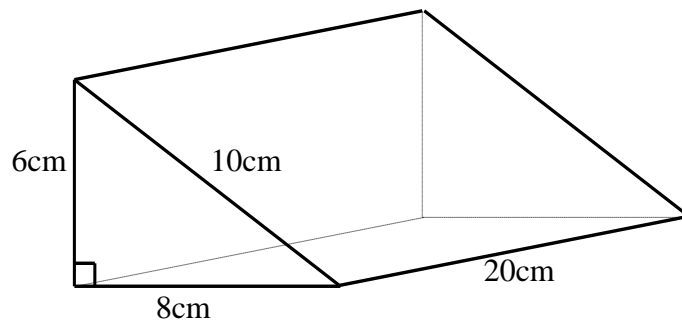
(a)  $\sqrt{45}$

(b)  $\sqrt{8} + \sqrt{32}$

(c)  $\sqrt{27} + \sqrt{48}$

(d)  $\sqrt{128} - \sqrt{8}$

11. Calculate the total surface area of the prism sketched below.



12. The diagram below shows a length of old sewer pipe.  
The cross-section consists of two concentric circles, the outer radius being 11 cm and the inner radius being 9 cm.  
The metal from which the pipe is made weighs 6.8 grams per cubic centimetre.  
Calculate the weight of a 100 metre length of the pipe.

